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(PATENT)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:
Clifford J. Hazel

Application No.: 10/081,735

Confirmation No.: 2926

Filed: February 22, 2002

Art Unit: 1714

For: FUEL COMPOSITION

Examiner: C. D. Toomer

SUBMISSION OF DOCUMENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby submits a certified copy of the following prior foreign application upon which a priority claim under 35 U.S.C. '119 has been previously and timely made by Applicant:

Country	Application No.	Date
United Kingdom	9827592.8	December 15, 1998

In support of this claim, a certified copy of the said original foreign application is filed herewith.

Dated: February 4, 2004

Respectfully submitted,

By

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INVESTOR IN PEOPLE

The Patent Office
Concept House
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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that the application is now proceeding in the name as identified herein.

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Signed

Dated 12 January 2004



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GB9827592.8

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

AAE HOLDINGS PLC
Unit 11, Bridge Road Business Park
HAYWARDS HEATH
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United Kingdom

Incorporated in the United Kingdom

[ADP No. 07799406001]

Patents Form 1/77

Patents Act 1977
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16DEC98 12141 16 002820
P01/77 0.00 9827592.8

Request for grant of a patent

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The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

P02080GB

2. Patent application number

(The Patent Office will fill in this part)

9827592.8

15 DEC 1998

3. Full name, address and postcode of the or of
each applicant (underline all surnames)

HAMELIN HOLDINGS, LIMITED
PO BOX 3186, ABBOTTS BUILDING
MAIN STREET
ROAD TOWN

Patents ADP number (if you know it)

If the applicant is a corporate body, give the
country/state of its incorporation

SECTION 80 (1) (1977 ACT) APPLICATION FILED 16.11.99
BRITISH VIRGIN ISLANDS

7570229001

4. Title of the invention

FUEL COMPOSITION

5. Name of your agent (if you have one)

LAURENCE SHAW & ASSOCIATES

"Address for service" in the United Kingdom
to which all correspondence should be sent
(including the postcode)

5TH FLOOR, METROPOLITAN HOUSE
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BIRMINGHAM B16 8TG

Patents ADP number (if you know it)

13623001

6. If you are declaring priority from one or more
earlier patent applications, give the country
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Country

Priority application number
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Date of filing
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Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right
to grant of a patent required in support of
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- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an
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Description

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Claim(s)

2

Abstract

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)Request for preliminary examination and search (*Patents Form 9/77*)Request for substantive examination (*Patents Form 10/77*)Any other documents
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11.

I/We request the grant of a patent on the basis of this application.

Signature

Date 15.12.98

LAURENCE SHAW & ASSOCIATES

12. Name and daytime telephone number of person to contact in the United Kingdom

LAURENCE SHAW : 0121.454.4962

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Agent's R f. P02080GB

FUEL COMPOSITION

The invention relates to a fuel composition. It is known that to meet some legislation requirements fuels must have a low Reid Vapour Pressure value (RVP), e.g. under California State law, the RVP must be below 7. RVP is measured at one atmosphere pressure and 100°F (about 39°C).

Some modern day gasoline contains a small percentage of a condensate from natural gas pipelines. The condensate is a light fraction which is primarily pentanes although other hydrocarbons may be present. The condensate adversely affects the RVP, especially when the gasoline contains an alcohol such as ethanol.

It is one object of this invention to provide a fuel composition incorporating an additive such that the RVP may be reduced even when other ingredients such as pentane-based condensate and/or alcohol are present.

According to the invention in one aspect there is provided a fuel composition comprising a hydrocarbon fuel, an alcohol and an additive selected so that an azeotrope of the additive, fuel and alcohol is formed whereby the composition has a lowered Reid Vapour Pressure value.

Preferably the additive :

- i) is a non-ionic surfactant;
- ii) is miscible with the fuel so that when added to the fuel a solution is formed;

iii) comprises:

- a) an oil soluble ethoxylated alcohol;
- b) an ethanolamide of a fatty acid formed by reacting ethanolamine and fatty acid in a ratio 1:1 whereby unwanted by-products are avoided;
- c) an ethoxylated fatty acid,

these being blended together to form a compound having the ethoxylated alcohol and the ethoxylated fatty acid at opposite ends of the ethanolamide backbone, the ethoxylated ends having substantially the same molecular weight.

Preferably the ethanolamide is a mono-, di- or triethanolamide. While the alcohol ethoxylate may have a varied number of groups preferably the alcohol ethoxylate has three ethoxy groups. Preferably the fatty acid has three ethoxy groups or seven ethoxy groups or nine ethoxy groups.

Preferably the hydrocarbon fuel is a gasoline. Preferably the alcohol is ethanol but it may be methanol or another alcohol or a combination.

The pentanes may be mixed with other hydrocarbons, depending on the source and of course they can be present in other ingredients, not just gasoline. The proportion may vary widely without adverse effect.

Other ingredients may be present such as oxygenates, e.g. ethers, esters; and the like.

3

In another aspect the invention provides a method of making a fuel composition having a low Reid Vapour Pressure value, the method comprising mixing a pentane condensate with an additive as defined.

The additive may be added to the fuel composition in any convenient way. Because the additive is compatible with pentanes it may be convenient to form a stock solution of the additive and the pentanes and add that to the fuel.

The content of the additive will be selected according to the nature of the fuel composition. Preferably sufficient additive is added so that the fuel has an RVP value below about 7 but this will depend on local requirements.

In order that the invention may be well understood it will now be described by way of illustration with reference to the following examples.

Example I

Different blends shown in Table I were made and subjected to gas chromatography. The ratio of hydrocarbon: ethanol was measured by gas chromatography. The results were used to indicate the extent to which the content of the ethanol could be incorporated without exceeding an increase in the temperature at which the volatile ingredients evaporated. The results showed the amount of ethanol that could be incorporated into the hydrocarbon without increasing the temperature at which the volatile components evaporated.

The additive comprised 60% by weight ethanolethoxylate, 20% by weight diethanolamide and 20% by weight of lauric diethanolamide. Our investigation suggests that these interact to form a compound in which the ethanolamide is a backbone.

Example II

Different blends were made up and the RVP determined. The following results were obtained:

TABLE II

<u>Sample</u>	<u>Gasoline</u>	<u>Ethanol</u>	<u>Additive</u> <u>As above</u>	<u>Water</u>	<u>RVP</u> <u>(1)</u>	<u>RVP</u> <u>(2)</u>	<u>RVP</u> <u>(3)</u>
1	90	10	-	-	7.48	7.7	7.58
2	87.5	10	2.5	-	7.18	7.41	7.29
3	85.0	10	2.5	2.5	6.87	7.11	6.98
4	85.0	10	2.5	2.5	6.96	7.19	7.06

The RVP value was measured according to ASTM 5191 and is the mean value of results calculated according to CARB (1), EPA (2) and ASTM (3) methods. In Samples 2, 3 and 4 the gasoline included a proportion of a condensate which was mainly pentanes. These results demonstrate a tendency of the additive to reduce the RVP value, and that by selecting appropriate proportions a fuel composition can be made to meet the requirements of local legislation.

TABLE I

Sample	Hydrocarbon (a)	Ethanol (b)	Pentane	Additive	Ratio (a) : (b)
1	90	10	0	C	15:1
2	89	10	0	1	16.7:1
3	82	13.5	4.5	C	17.75:1
4	77.5	13.5	4.5	4.5	11.69:1
5					
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CLAIMS

1. A fuel composition comprising a hydrocarbon fuel, an alcohol and an additive selected so that an azeotrope of the additive, fuel and alcohol is formed whereby the composition has a lowered Reid Vapour Pressure value.
2. A composition according to Claim 1, wherein the additive is a non-ionic surfactant, is miscible with the fuel so that when added to the fuel a solution is formed.
3. A composition according to Claim 1 or 2, wherein the additive comprises an oil soluble ethoxylated alcohol; an ethanolamide of a fatty acid formed by reacting ethanolamine fatty acid in a ratio 1:1 whereby unwanted by-products are avoided; and an ethoxylated fatty acid, these being blended together to form a compound having the ethoxylated alcohol and the ethoxylated fatty acid at opposite ends of the ethanolamide backbone, the ethoxylated ends having substantially the same molecular weight.
4. A composition according to Claim 3, wherein the ingredients of the additive are blended in the weight proportion of 60:20:20.
5. A composition according to any preceding Claim, wherein the hydrocarbon fuel is gasoline.
6. A composition according to Claim 5, wherein the gasoline is blended with a pentane or a condensate containing pentanes.

7

7. A composition according to any preceding Claim, wherein the alcohol is ethanol.
8. A composition according to any preceding Claim having a Reid Vapour Pressure below about 7.
9. A method of making a fuel composition having a low Reid Vapour Pressure value, the method comprising mixing a pentane condensate with an additive wherein the additive is a non-ionic surfactant, is miscible with the fuel so that when added to the fuel a solution is formed.
10. A method according to Claim 9, wherein the additive comprises an oil soluble ethoxylated alcohol, an ethanolamide of a fatty acid formed by reacting ethanolamine fatty acid in a ratio 1:1 whereby unwanted by-products are avoided; and an ethoxylated fatty acid, these being blended together to form a compound having the ethoxylated alcohol and the ethoxylated fatty acid at opposite ends of the ethanolamide backbone, the ethoxylated ends having substantially the same molecular weight.
11. A method according to Claim 10, wherein the three ingredients of the additive are present in the weight ratio of 60:20:20.
12. A method according to Claim 9 or 10 or 11, wherein the hydrocarbon fuel is a gasoline.